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उत्तराखण्ड लोक निर्माण विभाग,
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Geological assessment of 2 km long alignment corridor proposed for the construction of motor road joining Bhadeshwar mandir in Pujargaon with the Chinyalisaur-Jaugath motor road, Chinyalisaur block, Distt. Uttarkashi

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Shiv Kumar Rai

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1- Introduction:- The Provinical Division, Public Works Department, Chinyalisaur vide G.O. No. 333/III(2)/14-46/प्राठ्ठाप्रा /2013 dated 21.01.2014 has been entrusted for the construction of 2 km long motor road (Actual length is 1.825 km on the hill slope) joining Bhaeshwar mandir in Pujargaon with the Chinyalisaur-Jaugath motor road, Chinyalisaur Block, Yamnoutri Constituency, Distt. Uttarkashi. On the request made by Er. D.K. Bisht, Executive Engineer I carried out the geological Assessment of the proposed alignment corridor on 13.01.2017. Er. P.K Aggarwal, Astt. Engineer also accompanied the site visit.

2- Location:- The proposed alignment corridor of the above said motor road originates from the Bhadeshwar mandir of Pujargaon and ultimately joins with the Chinyalisaur –Jaugath motor road comprising 2 HP bend at Chainage 0/27 and 0/35 of 1.825 km across the hill slope.

3- Geological Assessment:- Chinyalisaur and its surrounding areas including the alignment corridor geologically forms a part of Garhwal Lesser Himalayan Belt. This area is represented by the rocks quartzites, phyllites, shales/slates belonging to Nathuakhan and Betal Ghat formation of Ramgarh Group and the Berinag quartzite of Jaunsar Group. The terrain containing this alignment is characterized by the hill slopes including gently between 30^0 - 35^0. Most of this alignment corridor comprised the thick cover of overburden material and scant outcrops of bed rocks. The rocky slopes are exposed in isolated stretches of irregular pattern. The rock quartzites exposed along this alignment corridor are interbedded by thin bands of slates. Generally the rocks exposed along the alignment are slightly weathered, moderately hard and dissected by many numerous joint sets. The joint planes are linear and tight. According to the estimation made manually at the site the "Uniaxial Compressive Strength" of the rock masses exposed on the cross slopes of this alignment was found ranging between 80 M Pa to 100 M Pa. At places where the rock masses are sheared, shattered, tectonized and distressed in nature these values could not be obtained. This may be due to the affect of the Srinagar Thrust (ST) and a located fault presenting the surrounding vicinity.

The overburden material deposited on the cross slopes of this alignment is naturally dense, hard, compact in nature and it is comprised of the isolated rock fragments embedded din the sandy silty clayey matrix. Huge boulders are also exposed on the cross slope which indicate that this area undergone a sliding activity in ancient time. The soils are mostly clayey and good cohesive in nature. The overburden material deposited on the cross slopes of this alignment do not contain any soft/dispersive soils. These soils exhibits good physical competence in dry state. According to the assessment made at the site the "Undrained Shear Strength" of the composite soils exposed along this alignment was found ranging between 3350 K Pa to 450 K Pa.

The terraces developed on these slopes which are adjacent to the corridor are undeformed and do not manifest signatures related to the downward and outward movements. The entire visible ground in and around this alignment corridor do not bear signatures related to the ground subsidence and nowhere sink/pot holes were encountered during the walkover survey.

By and large the cross slopes of this alignment are stable and free from any recent landslides and any other mass wasting activities.

On the basis of above geological inspection, study carried at the site following recommendations are being made for the construction of the proposed motor road failing to these recommendations this report will be treated automatically as cancelled.

6- Recommendations:

1- Form the road by half cut and half fill technique and compact the fill material by dynamic compaction.
2- Do not throw the excavated waste on the lower slope otherwise it will damage the houses located lower slope and lead hill slope stability.
3- In order to maintain the overall stability of the hill slopes and the road construct suitably designed retaining walls/ brest walls all along the road.
4- Construct large hill side lined/concrete drain all along the road and make adequate cross drainage arrangements.
5- Make adequate arrangements to dispose the waste water on the safe/ stable ground.
6- All the construction activity must be carried out as per the Indian standards codes of practice and norms prescribed by the BIS.

7- **Conclusion:** On the basis of the geological / geotechnical studies carried at the site and with the above recommendations, the proposed 2 km long alignment corridor (actual length is 1.825 km across the hill slope) was found suitable for the construction of motor road joining Bhadeshwar mandir in Pujargaon with the Chinyalisaur-Jaugath motor road comprising 02 HP bend, Chinyalisaur Block, Yamnoutri Constituency, Distt. Uttarkashi.

(Shiv Kumar Rai)
Astt. Geologist
Office of the Engineer in Chief
PWD, Dehradun